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Pathobiology— a multidisciplinary teaching and research group

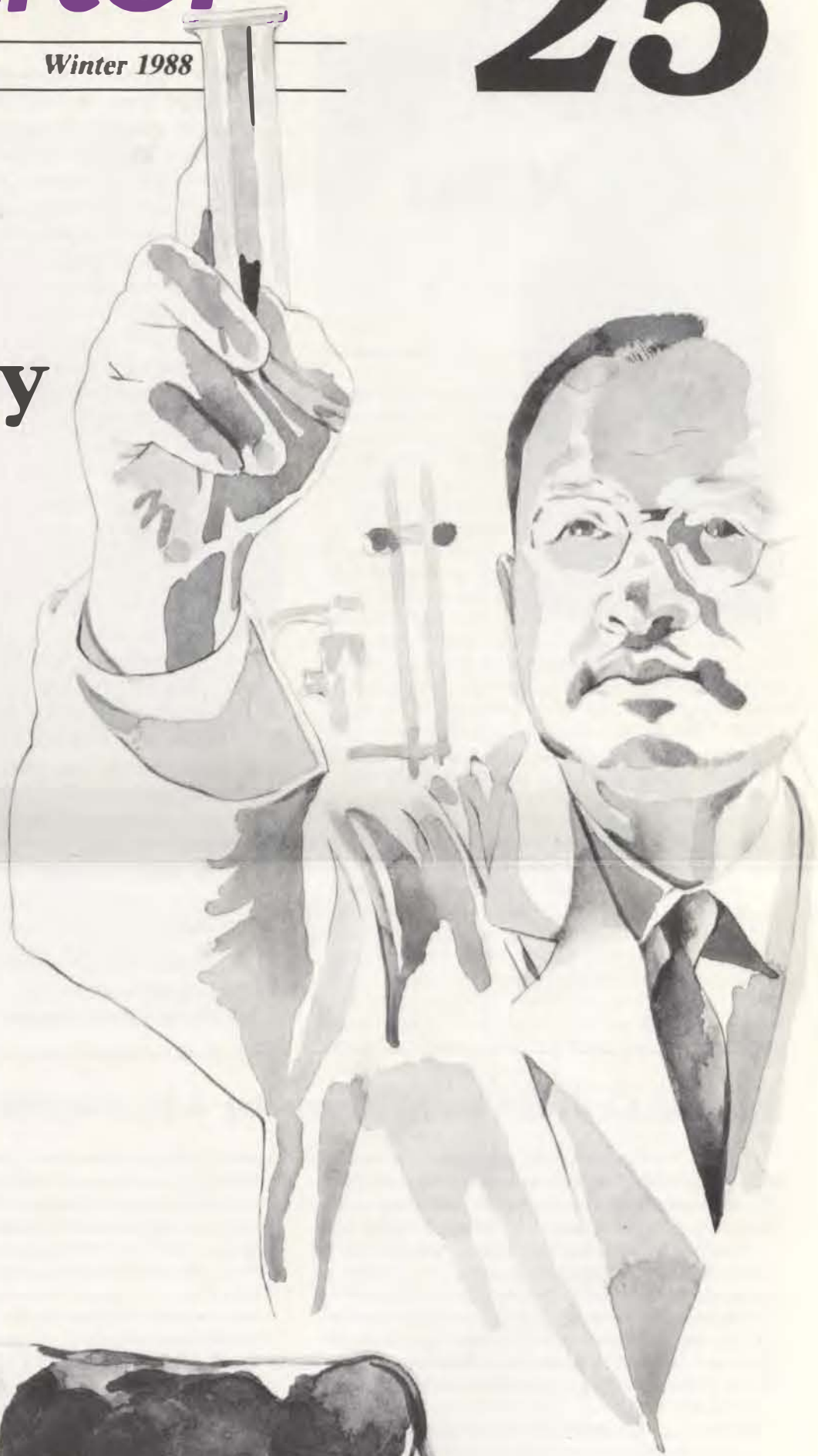
The department of pathobiology, one of four major departments in the School of Veterinary Medicine, includes the laboratories of microbiology and immunology, pathology, parasitology, large animal pathology, and avian medicine and pathology. For the past decade, the department has been chaired by Dr. Wilfried T. Weber, professor of pathology. As elsewhere in the School, significant and important changes have occurred in the department during this period. As examples, one can point to a more than six-fold increase in research funding since 1978, an increase of faculty participation in funded research from 38 percent to more than 90 percent, important changes in the teaching program, a significant increase in diagnostic capabilities, and substantial improvements and upgrading of equipment and research space. In the latter category one of the more notable additions is the construction of a new state-of-the-art, multi-user laboratory of more than 2,000 ft², which will be most useful in attempts to recruit additional faculty.

At present, a search for a new chairman is underway, as Dr. Weber will step down from the chairmanship at the end of the academic year to again devote his full time to scholarly activities. Studies by the multi-disciplinary faculty range from the development of recombinant vaccines to eradication methods of parasites in the Third World. The above mentioned laboratories within the department all are in the forefront of research within their respective fields.

Recently Drs. Leonard J. Bello and William C. Lawrence of the laboratory of microbiology and immunology developed the first species-specific recombinant vaccine. By utilizing sophisticated biotechnology, they were able to modify Bovine Herpes-virus 1 (BHV1) and employ it as a vector for genes of other pathogens. This virus affects only cattle and possibly a few other closely related species, and it causes bovine rhinotracheitis, an infectious respiratory disease. It has no effect on humans or other non-ruminant species, thus a spillover into other populations cannot occur. "Other recombinant vaccines utilizing a viral vector have been based on the vaccinia virus which may affect a multitude of species," explained Dr. Lawrence. "BHV1 affects only bovines and poses little, if any danger to other species."

When a virus infects an animal or human, the

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From the Dean



As we approach the Spring and the freshness of a New Year, we look forward to both new horizons and new beginnings.

Further steps in our focus on agricultural medicine are in evidence with the recent dedication of the Stubb's Laboratory for poultry research. We have also cleared the paths for construction of the Mark W. Allam Dairy Cattle Teaching and Research facility and the Center for Animal Health and Productivity building, both at our New Bolton Center campus.

In April we will place a capstone on the most important and successful capital campaign ever attempted by the School, The Second Century Fund Campaign. The more than 40 million dollars provided through pledges, gifts and bequests will, in future years, provide the necessary fuel for the School's continued growth.

Our Strategic Planning Steering Committee will have completed the bulk of its important and time consuming task. Already we have begun the process of reshaping our mission to coincide with the future needs of the Commonwealth, nation and indeed, the world.

Coincidental with our efforts, the new provost of the University has initiated a comprehensive planning process, hopefully to be completed by the end of this academic year.

What is of particular interest to us as a School are the areas on which he has chosen to focus. The seven committees currently working on this plan are:

*Undergraduate education
Graduate education
Professional education*

Research

Academic information environment

Faculty development

International dimensions

All of these areas are critically important to our own planning process. While undergraduate education may normally be out of our realm, it certainly impacts our ability to recruit top quality students into our graduate and professional degree programs. The focuses on educational mission, research and international outreach blend well with our individual school needs. Critical to our future success is the ability to transfer, store and access all types of information. The focus on our libraries, computer networks and information exchanges will represent key elements in our school plan.

Finally, the focus on teaching excellence and quality development, a sorely needed program, will also assist us in deliberating our own organization and resources.

Pinioned as a gear between the support and guidance of the Pew National Veterinary Education Program and the influence of the provost's University-wide planning process, we at the School will reap benefits as we structure our own mission and strategic plan.

Despite our continued fiscal constraints, we are blessed with a supportive faculty and staff, understanding students and generous alumni and friends. Together we will continue to move toward financial and organizational stability while reshaping our direction for the future.

Edwin J. Andrews, V.M.D., Ph.D.

Second Century Fund Nears the \$40,000,000 Mark

The Second Century Fund continues to grow and is nearing the \$40,000,000 mark. Generous support given by our many friends over the past few months raised the total on January 15, 1989 to \$39,888,128!

Thank you everyone for making this past year a successful one at Penn. Since January 1, 1988, we added \$6,866,000 to the Second Century Fund! This is a wonderful tribute to all of our contributors and to the many volunteers — Alumni, Board of Overseers and other friends — who helped in the effort. The credit for our success is due to all of you — Thank you.

We have a number of individuals to acknowledge for their generosity: Loy Awkerman, V.M.D.; Mr. A. W. Berry; Mr. and Mrs. Stanley Cohen; Mr. Robert Coult; Mr. John Deuss; Mr. & Mrs. Richard Eggleston; Mr. Frank Ewing; Mrs. Philip Fell; Mr. & Mrs. Edgar Griffiths; Mr. Richard Hammond; Elinor B. Jenny, V.M.D.; Mr. Eberhardt LeSchin; J. D. McCullough, V.M.D.; Mrs. Gwynne McDevitt; Mr. & Mrs. Ellice McDonald, Jr.; Mr. Vincent Murphy; Mrs. Archibald Randolph; Mrs. Doris G. Rankin; Mr. & Mrs. Alan Robson; Mr. & Mrs. Hardie Scott; Mr. & Mrs. Gerald Schreiber; Mr. Steven Steinberg; Mrs. Mary Smith; Mrs. Laura Thorn; Mr. Oakleigh Thorne; Mrs. Ann F. Thorington; Mr. Alan Weiler; and Mr. & Mrs. Charles Wolf. In addition, gifts were received from the Estates of David George Jones and Lady Constantine J. Sorsbie.

A number of foundations made important

contributions to the Fund: American Veterinary Medical Association Foundation; Arcadia Foundation; Biery Family Foundation; Business & Professional Women's Foundation; Edna McConnell Clark Foundation; Connelly Foundation; Doris Duke Foundation; Equine Research Foundation; Grayson Foundation; Grundy Foundation; Dorothy Russell Havemeyer Foundation; Philip B. Hofmann 1966 Charitable Trust; National Retinitis Pigmentosa Foundation; Pellegrini Scholarship Fund; Pew Charitable Trusts; Reider Foundation; Roebuck Foundation; Marilyn S. Simpson Charitable Trust; and, W. W. Smith Charitable Trust.

The Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation made a significant contribution to support a post-doctoral training program in veterinary genetics. The \$431,164 grant over four years helps advance the School's leadership in this important area. (See accompanying article elsewhere in this issue).

Gifts from corporate contributors also added to the total: Hill's Pet Products; Howmedica; Kal Kan Foods; Lloyds of London Underwriters; Mellon Bank East; Merck & Company; Paraid; Henry Schein, Inc.; and, SmithKline Beckman Corporation.

Last, but certainly not least, a group of associations showed their support of our efforts: American Heart Association; American Livestock Association; American Quarter Horse Association;

Chester County Kennel Club; Del Valle Dog Club; Devon Dog Show Association; French Myopathy Association; Garden State Cat Club of New Jersey; Horsemen's Benevolent & Protective Association; Irish Setter Club of America; Muscular Dystrophy Association; North Western Connecticut Dog Club; Penn Treaty Kennel Club; Penn Jersey Cat Club; Pet Industry Joint Advisory Council; Pharmaceutical Manufacturers' Association; and, Princeton Small Animal Rescue League.

To all of these contributors, we express our appreciation and gratitude for their generous commitment to the School. We are into the home stretch of the campaign and prospects for a successful conclusion are in hand. With everyone's continued assistance we will cross the finish line with winning colors.

Jeffrey P. Roberts
Assistant Dean for
Development and Planning

New Service to Poultry Producers

Each week Dr. Sherrill Davison travels more than 400 miles making visits to poultry farms in Pennsylvania. Dr. Davison, a lecturer in Avian Medicine and Pathology, specializes in flock health problems. Her visits to poultry farms are part of a flock health program initiated by the Center of Animal Health and Productivity at the New Bolton Center campus of the University of Pennsylvania School of Veterinary Medicine. The Center for Animal Health and Productivity, funded by the Commonwealth of Pennsylvania, is the only one of its kind in the area.

Dr. Davison graduated from the University of Pennsylvania School of Veterinary Medicine in 1983. After two years in small animal practice, she returned to the University in 1985 for a residency in avian medicine and pathology and a masters degree in epidemiology through a training grant in epidemiology and health economics. This program, funded since 1984 by the Pennsylvania Department of Agriculture, currently has three fully funded and three partially funded participants. Five veterinarians, including Dr. Davison, have completed the program so far.

In Dr. Davison's new position, a major portion of her time will be devoted to field investigation of new or serious disease problems of poultry. "Routine visits to poultry farms are a new service offered by our laboratory," explained Dr. Davison. "In the past, producers would bring sick birds to the laboratory and based upon the findings in these birds a diagnosis and treatment plan was suggested. Often, this did not get to the root of the problem because the veterinarian at the laboratory could not observe the birds in their normal environment. By visiting the farm and observing the birds and management practices, one can better assess the problem so preventive measures may be taken at once."

Pennsylvania, a major poultry producing state has a geographically mixed population of 17 million



Dr. Davison

layers, 115 million broilers, 7.6 million turkeys and 850 thousand commercial egg and meat type breeders. The state ranks 3rd in table egg, 12th in broiler, and 9th in turkey production in the United States. Pennsylvania's poultry population is concentrated in five contiguous south-central counties (Lancaster, Lebanon, York, Adams and Berks) with approximately 50 percent of the flocks in Lancaster County.

The birds are kept in large houses with flock size ranging from 25,000 to 100,000 birds. Watering,



Chicken with L.T.

feeding and ventilation are automated. These buildings are off limits to anyone who is not wearing protective clothing (hats, boots, and coveralls) to minimize the risk of people introducing disease into the flock.

The broiler industry varies from other livestock production farming in that many producers raise birds under contract for large feed companies. The feed company, not the producer, owns the birds. The trend in the poultry industry, especially the broiler segment, has been toward vertical integration. A company will own from the hatchery to the processing plant. Feed companies employ servicemen who monitor daily health and management problems in the flocks. If a problem arises, they diagnose it and treat it, or if further assistance is needed, birds are submitted to a poultry diagnostic laboratory.

Dr. Davison may be contacted when a new or serious disease is suspected. One disease that has recently caused outbreaks in Pennsylvania as well as in other states is laryngotracheitis (LT). LT is a respiratory disease of chickens caused by a herpes virus. Pennsylvania has experienced two severe outbreaks over the past four years. In 1984-1985, 38 flocks consisting of approximately 1.8 million chickens were affected with LT. In 1987-1988, 86 flocks consisting of over 5 million chickens have been confirmed with LT. The majority of affected flocks were unvaccinated broilers, however, pullets, layers, breeders, roasters and backyard flocks were also diagnosed with LT.

Dr. Davison has coordinated the control program for LT in Pennsylvania and has organized a network of producers who meet with her to discuss the status of the LT outbreak. "We now have 25-30 representatives from various companies who meet and coordinate their vaccination program for LT." She keeps industry personnel informed about the current status of LT through a weekly newsletter.

Dr. Davison has done extensive research on LT. These include assessment of vaccination programs, transmission studies and the role of maternal antibody protection. There are still many unanswered questions concerning LT. The Laboratory of Avian Medicine and Pathology will continue to do research on LT focusing on the characterization of field isolates using challenge work and restriction endonuclease studies.

LT is hardly the only disease affecting poultry. Other diseases commonly seen at our laboratory include *E. coli* and other bacterial infections, Marek's disease, and *Mycoplasma gallisepticum* and more recently, adenovirus infections. Marek's disease is caused by a virus which affects the nervous system by the formation of tumors. *Mycoplasma gallisepticum*, a bacteria-like organism, causes respiratory disease and a moderate to severe drop in egg production.

Dr. Davison explained that there is a shortage of veterinarians trained in poultry medicine. "There are many opportunities for veterinarians in the poultry industry. Positions are available in diagnostic laboratories, academia, research, extension, government as well as in biologic manufacturing companies."

Grant to Support New Training Programs

The Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation has provided a \$431,164 grant over four years to support the development of a postdoctoral research training program in medical genetics for veterinarians.

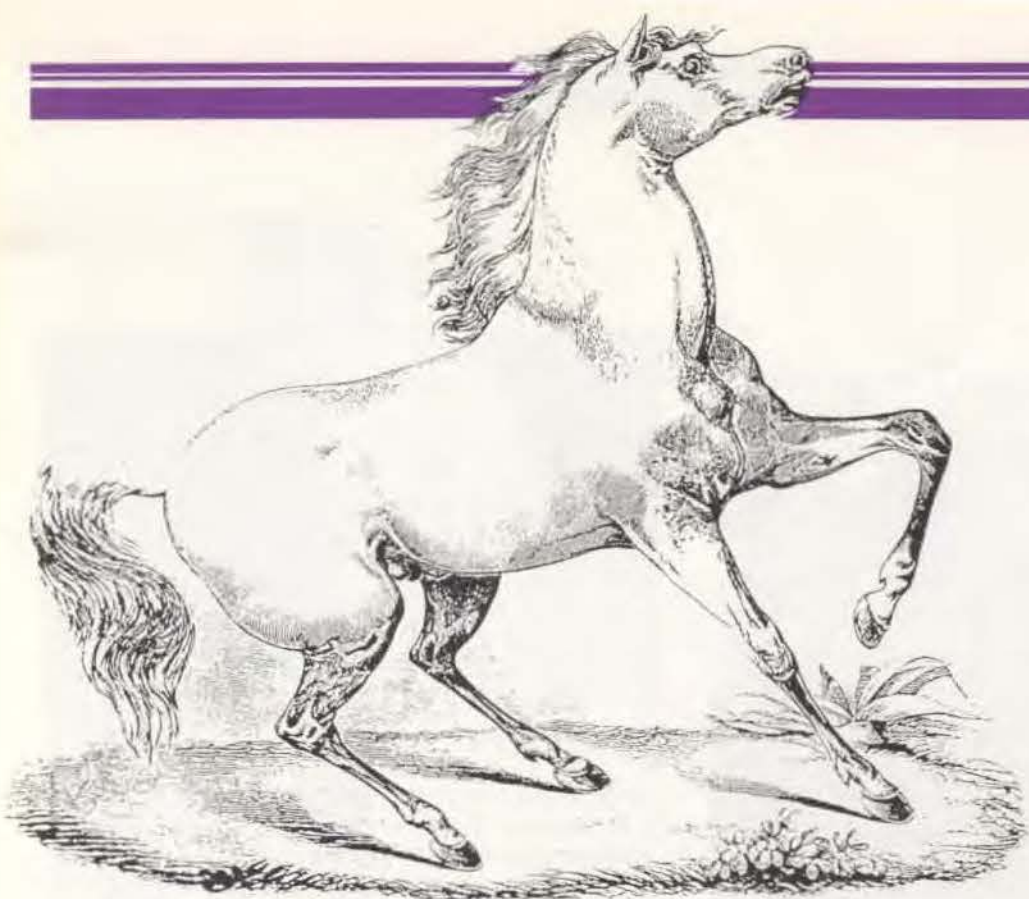
"The objective of this program is to attract and train talented veterinary scientists in genetics research, emphasizing those fields which provide the greatest potential to advance the understanding, treatment, and prevention of diseases in which genes play a major role," said Dr. Donald F. Patterson, Charlotte Newton Sheppard Professor of Medicine and chief, section of medical genetics. "It is expected that the program will produce a cadre of outstanding young scientists who will not only advance knowledge, but through their influence on the profession and related fields, will serve as leaders in the further development of veterinary medical genetics. We anticipate that during the four years of the initially funded program four veterinary scientists will complete the training." Fellowships will be offered to veterinarians with outstanding academic records and demonstrated talent in areas basic to the field of genetics.

Because of their broad education in the biological medical sciences and their direct involvement in the health and productivity of animals, veterinarians are ideally suited to play a major role in research into the basic mechanisms involved in genetic diseases, gene therapy, and in the identification and engineering of genes that will be important in producing disease

resistant livestock. It is important to recognize that the structure and function of genes in animals have a fundamental homology to those in humans. Thus the genetic diseases that occur in animals are essentially the same as those in man, and new knowledge gained through research in animals will be of direct benefit to human as well as animal health.

The powerful tools of recombinant DNA technology are opening up exciting new possibilities for correcting genetic defects and for producing disease-resistant animals. Although the veterinary profession, particularly here at Penn, has made some important contributions to this field, nationally fewer than ten veterinarians are skilled in the research methods of modern genetics. Biomedical science needs many more young investigators who have both the special perspective of veterinary medicine and the training in modern genetics to lead the profession in this new field of research.

If the veterinary profession can attain a critical mass of research scientists trained in modern genetics, not only will their individual contributions to animal and human health be great, but a whole new area of research will be opened up to veterinary medicine. Once established, the contributions of veterinarians to genetics research will stimulate further opportunities in schools of veterinary medicine and medicine, animal science departments, government research laboratories, and in the pharmaceutical and livestock industries.



Equine Symposium

In the summer issue we carried summaries of three presentations at the Equine Symposium held in April at New Bolton Center. Following are summaries of the remaining three presentations.

Life-Threatening Complications in the Mare

Dr. James A. Orsini, assistant professor of surgery, discussed equine colic and torsion of the uterus, two life-threatening complications which can occur in the mare.

Colic is a general term referring to abdominal pain with particular reference to the gastrointestinal tract. Signs in the horse may vary from slight discomfort, stretching and restlessness to violent rolling and kicking. Causes generally include environmental factors (such as a change in climate). An example may be a change in weather where it becomes very cold; the animal may not drink and is more likely to develop an impaction.

Change in feed, types of hay or grain, coarse or icy feeds, excessive grain, and excessive exercise have also been implicated. Ingestion of rubber fences has also been a cause. A sandy environment predisposes the animal to sand impactions. Straw or wooden shavings may be ingested and cause impaction. A bad worming program or teeth which need care are also contributing factors.

Parasites are well known as a cause for colic. Infarcted (lack of blood) gut can result due to emboli (traveling fragments of parasite or a blood clot) forming a blockage of the cranial mesenteric artery (main vessel to the intestinal tract) or other major vessels supplying the intestine. Specific disorders that may cause colic include a twisting of the intestine, volvulus (torsion), infolding of one segment of the intestine within another (intussusception), pyloric obstruction, strangulated hernia, etc.

In the pregnant mare, one of the more life-threatening forms of colic that occurs is a large colon volvulus (twist). Volvulus or torsion of the entire large colon can occur; this may include the caecum or just a portion of the large colon. The etiology of volvulus of the large colon is unknown. Strongyle larvae (blood worms) have been implicated. Others believe it may be because of more space in the abdomen when a portion of the liver atrophies with age or following parturition.

Signs are continuous pain and range from mild to violent. The animals may move violently, tread and sweat. In the advanced stages the animals become severely depressed with an elevated respiratory rate and have a markedly distended abdomen. When the large colon is twisted, it is often tight, with palpable bands on rectal examination and distended large intestine. Volvulus of the large colon causes the most severe and fatal form of colic.

Affected animals show a very severe, unrelenting

colic as a general rule. They rapidly deteriorate physiologically, showing rapid, weak pulse, toxic mucous membranes, elevated packed cell volume and serosanguinous peritoneal fluid. There is little motility and bloating occurs rapidly. Any mare with a large colon volvulus, or any horse for that matter, should be treated as a surgical emergency.

Survival depends on the severity and duration of the vascular embarrassment. Because of the loss of vascular integrity to the twisted portion of the bowel, there is a large loss of protein and fluids into the extravascular space (outside the vessel wall) and into the lumen of the bowel. Therefore, the total protein has to be monitored closely during fluid administration, and if it falls below the level of 4 gm/dl (normal being 6 to 8 gm/dl), a plasma transfusion may be needed. This large loss of protein and endotoxic shock (bacterial producing) are the main reasons for the poor survival rate. Therefore, early recognition and prompt treatment are essential with intensive supportive therapy after correction of the volvulus.

Torsion of the uterus occurs in the latter stages of gestation, possibly associated with the mare's rolling or falling or with excessive activity of the fetus. Equine uterine torsion is seldom associated with parturition. This condition is rare in the mare because of the dorsally attached broad ligaments, limiting the twist to 180 degrees.

Signs of uterine torsion are restlessness, anorexia, abdominal pain or colic and frequent attempts at urination. These prolonged signs resemble those seen in the early stages of parturition, and in late pregnancy, usually with a tightly closed cervix. The anterior vagina should be examined for the twisting or folding of the wall, indicative of torsion. A rectal examination will need to be performed by a veterinarian to determine the direction of the twist and the degree of tension on the broad ligaments. In many uterine torsions, a twisted portion of the genital tract only involves the body of the uterus cranial to the cervix and the anterior vagina.

If the condition is diagnosed early and fetal death and rupture of a large blood vessel (uterine artery) has not occurred, the prognosis is usually guarded to favorable. Torsion may be relieved by sedating or anesthetizing the mare and rolling her in the direction of the torsion. If this conservative method fails, a laparotomy (incision into the loin) through the right or left flank in a standing or recumbent mare may be performed, with the torsion corrected manually.



Strongyle vulgaris



Cranial mesenteric arteritis secondary to larval migration.

Laminitis

Dr. William Moyer, associate professor of sports medicine, spoke about laminitis (founder) which remains one of the most common devastating problems in the horse world. Insurance companies claim that laminitis is second only to colic for the number of mortality claims.

The problem has been researched extensively, but it still remains somewhat of an enigma. Its causes are multiple and the end result of the disease is structural damage in the feet. In acute laminitis the blood supply to the foot is shut down, resulting in extreme pain for the animal. Several popular misconceptions about disease exist:

1. The most common cause is eating too much grain — this is just one of the many causes and it is not very common today.

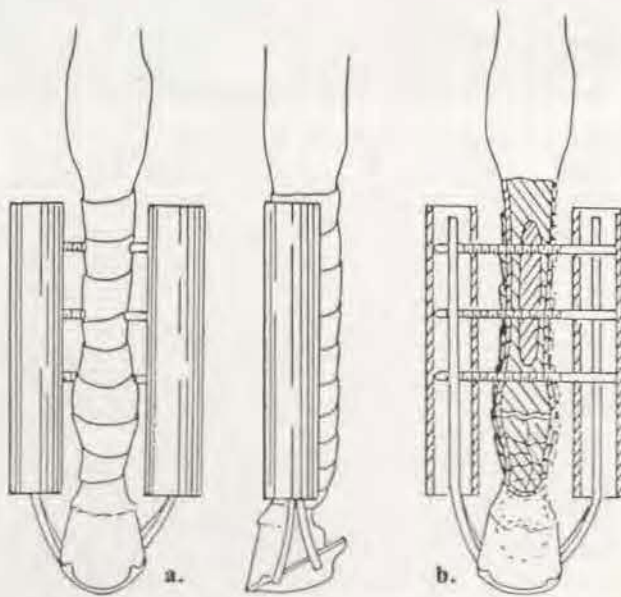
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Serious Injuries to the Athlete

Dr. David M. Nunamaker, Jacques Jenny Associate Professor of Orthopaedic Surgery, briefly discussed immediate unrestricted weight bearing following fracture fixation through the use of two new techniques developed by researchers at New Bolton Center. The ability to allow immediate full weight bearing is important in the horse following fracture treatment because this species cannot tolerate recumbency for long periods of time. If the animal cannot bear full weight on one leg, laminitis may result in the foot of the limb that is bearing all of the horse's weight.

For the past several years, the Comparative Orthopaedic Biomechanics Laboratory at New Bolton Center has been developing techniques designed to allow immediate, full, unrestricted weight bearing following fracture fixation in the horse.

As a result of the research an external skeletal fixation device (ESFD) for equine patients was developed. This new external skeletal fixation device with foot support was designed to allow immediate full weight bearing following fracture fixation in the horse. Since many fractures in the horse are comminuted and occur in the short bones of the lower limb, the device was designed to transfer



a. Dorsal and lateral views of the ESFD are depicted with transfixation pins penetrating the third metacarpal bone.

b. A frontal cross-section shows the relationship of the transfixation pins above a simulated fracture of the first phalanx.

Laminitis continued from page 4

2. It is a disease of the feet only — not true. The problem in the feet is a manifestation of a problem which began elsewhere (digestive system, reproductive tract, generalized infection, etc.).
3. It affects the front feet only — not true. The hind feet are affected, but usually to a lesser degree because the horse bears 60-65 percent of its weight with its frontquarters.
4. Laminitis is not necessarily an emergency — not true. It should be treated as quickly as possible.
5. The problem is resolved once lameness, heat, etc. are no longer present (assuming that these features do disappear) — not true. Often the structural damage is permanent and one cannot assume that relief of pain means that the problem is resolved.
6. Radiographs will predict the outcome or the severity of the disease at the time — not always true. Radiographs are very useful but they are not the 'do all-end all.'
7. A single method of treatment is uniformly successful — not true. A successful outcome requires early treatment, control of the cause, constant care, and therapy designed for the individual horse.
8. Fever causes laminitis — not true. The cause is the disorder which resulted in the fever, not the fever per se.
9. The following features must be present to have laminitis: foreleg lameness, heat in the feet, increased pulse, a camped-out stance, etc. The variation in clinical findings is tremendous. For example, laminitis may involve one foot only, it may involve both hind feet and not the front feet, it may exist on a horse which appears to be sound, it has been known to look like stringhalt, etc.

Laminitis is an emergency and the sooner therapy begins the greater the likelihood of arresting the progression of the disease. It has to be kept in mind that by the time lameness and clinical signs are present, damage already exists. If the underlying cause is not eliminated the damage to the foot will continue. As soon as laminitis is suspected, the

veterinarian should be contacted. He or she may not be able to see the animal immediately but can suggest steps that can be taken to lessen the horse's discomfort. The owner should provide the practitioner with the following information: the animal's heart and respiratory rate; rectal temperature; severity of lameness; a guesstimate of the cause or recent changes the horse may have encountered.

On his initial visit the veterinarian performs a general physical examination to determine the overall health status, the cause of the laminitis, and the degree of pain. A close examination of all four feet is performed (coronet, hoof wall, sole, etc.). This may involve the use of hoof testers, hoof knife, and other diagnostic tools. Radiographs are very helpful to determine the position of the coffin bone within the hoof capsule and to get some idea as to the damage to the feet at the time of the radiographs. Treatment is then initiated for the underlying disease and for the laminitis. Subsequent visits and nursing care are absolutely essential. Generally it is a good idea to keep afflicted horses from actively exercising until all clinical signs have been absent for a time. When a horse can resume exercise has to be determined in each individual case.

Laminitis is a potentially fatal problem. Its causes are not fully understood at this time. Treatment must be designed to cure both the underlying disease and the feet. No one therapy or treatment regimen is always successful. Laminitis should always be suspected when dealing with a sudden onset of lameness involving both front feet, but one must be aware that a variety of signs exists. There are a number of high risk conditions which make the horse more susceptible to laminitis: acute or chronic colic; any severe illness, brood mare and foaling problems; prolonged lameness forcing the animal to spend most of its time on the "good leg"; ingestion of large quantities of grain or new spring grass. Studies have shown that one of the highest risk patients is the overweight show horse which spends a good bit of time on the road.

weight bearing forces from the intact bone above the injury to the ground.

Fixation of the limb distal to the injury is accomplished by attaching the hoof to a plate on the distal end of the frame. In this way, an injured animal can bear weight across the fractured area. To accomplish this, the ESFD has to be very stiff and strong. The strength of the device is related to the diameter of the transfixation pins and the distance from the bone to the longitudinal sidebars.

The pin diameters chosen for this design were sized specifically for use in the equine third metacarpal bone. To ensure strength and low cost of pin sidebar connections, a fast-curing, extremely strong polymeric substance is used to form the sidebars. This material is poured into flexible tubing pushed over the ends of the pins and contains the longitudinal metal tubing of the frame and foot support. The frame is attached to the horse's hoof by a shoe nailed into place and bolted to the frame foot support. Fracture reduction is accomplished before the sidebars are poured. Following application of this device, the horse is recovered from anesthesia and allowed immediate weight bearing. The ESFD is used in horses for closed or open comminuted fractures that would not be amenable to conventional open reduction and internal fixation methods as practiced in horses. It has also been used successfully to fuse the fetlock joints in some horses with "breakdown" injuries in which the soft tissue around the joint is severely traumatized.

Dr. Nunamaker also discussed an improvement in internal fixation of fractures with plates and screws. Internal fixation using plates and screws requires good immobilization of the fracture fragments if healing is to be achieved. The forces of weight bearing add greatly to the stress on the plates and screws, resulting in loosening of the device, shifting of fracture fragments and shearing of the screws. In horses, the unavoidable stresses of weight bearing have often led to loosening of the implants, failure of the fixation and eventual loss of the horse's life.

The term "plate luting" has been coined to describe the application of a space-filling substance between the bone and plate to increase the contact area between them, which in turn should improve the interfacial shear strength between the bone and the plate. Bone has a curved surface and the heavy stainless steel plates cannot be bent to achieve complete, continuous contact with bone. Luting the plate to a bone with polymethyl methacrylate (PMMA) or some other suitable agent allows for complete contact between the bone and the plate and thereby increases the frictional forces between the plate and the bone that allow comfortable weight bearing.

The luting material is polymethyl methacrylate, the same 'bone cement' that is used in humans in some joint replacement surgeries. Besides making for a more perfect fit between the plate and the bone, the luting material fills the plate holes around the screw holes as they are tightened and helps prevent screw loosening, another of the major causes of fixation failure.

Laboratory studies with bones in a testing machine have shown that the technique of luting actually increases the duration of effective fixation by ten times or more. In live animals, the results have been just as encouraging and no deleterious effects have been found. In particular, the results in foals with severe long bone fractures (radius, tibia, femur, etc.) have been markedly improved. Many fractures in foals that previously were rarely treated successfully now have success rates near 90 percent.

A patent has been granted for the external skeletal fixation device which was invented by Dr. Nunamaker and Dr. Dean Richardson, assistant professor of surgery. A patent has been applied for for the plate luting.

Improving Calving Intervals with Prostaglandin

Pennsylvania dairy farmers lose an estimated \$90 million each year due to prolonged calving intervals in their cows. In registered herds, the average calving interval is estimated at 13.5 months. However, only half of the state's dairy cows are registered and the calving interval for all dairy cows in Pennsylvania probably exceeds 14 months. There is general agreement that the optimum calving interval for production efficiency is 12 months and that \$2 are lost for every day over this period. The longer calving interval is due primarily to poor heat detection and low first service conception rate. Studies have shown that heat detection and first service conception rates are both lower than 50 percent.

Researchers at the University of Pennsylvania School of Veterinary Medicine are studying whether treatment of postpartum cows with prostaglandin F2 alpha at regular intervals can improve heat detection, shorten the calving-conception interval, and whether such treatment will have a beneficial effect on fertility.

"Prostaglandin F2 alpha is a naturally occurring hormone," said Dr. Charles Love, one of the investigators. "It has no side effects on the animal and is metabolized rapidly, within 60 to 90 minutes after injection." The prostaglandin acts upon the corpus luteum, a gland which develops once a follicle has released the ovum. The corpus luteum produces mainly progesterone, a hormone needed to maintain pregnancy. If the animal has not conceived, the corpus luteum will regress naturally over a period of



time. Prostaglandin causes the corpus luteum to regress quickly and the cow will come into heat again much sooner. By injecting a postpartum cow at regular intervals with prostaglandin, the period between heat cycles can be shortened, theoretically increasing the number of cycles prior to breeding.

"Studies have shown that conception rate goes up the more estrus periods a cow experiences prior to breeding," said Dr. Love. "By injecting the hormone at regular intervals we can create two or three short estrus cycles before the cow is serviced."

Penn's researchers are studying a herd of 400 dairy cows at a near-by farm. The herd has been divided into two groups. One group is injected with prostaglandin F2 alpha at days 22, 36, and 49 postpartum. The control group is injected with a saline solution on days 22 and 36 postpartum. On day 49, these cows receive a prostaglandin F2 alpha injection. All cows are examined rectally and tested for milk progesterone on days 22, 36, and 49 -prior to the injection.

The milk progesterone level can provide an indication of the stage of the heat cycle. If the animal is out of heat about five days, the progesterone level will be high. The level will also be high if the cow has luteal cysts. The value will be low if the animal is not cycling, if it is just prior to ovulation, or when it has follicular cysts. These three conditions can often be differentiated through rectal examination.

Dr. Love explained that a regimen of prostaglandin injections postpartum could enable a

farmer to somewhat coordinate heat cycles within a herd. "Cows are only in heat for 12 to 18 hours and the biggest problem is to know when to breed. If more than one cow is in heat at one time the animals will exhibit mating behavior, such as mounting each other. This can be observed. When interaction occurs, the farmer knows that the animal is ready to breed."

The researchers also hope to ascertain whether the injections reduce the rate of uterine infections. "It is known that prostaglandin causes contractions which help evacuate the uterus," said Dr. Love. "This may help to remove any postpartum debris and thus reduce the chance of uterine infection."

The two-year study, funded by the Pennsylvania Department of Agriculture, should provide some answers to the calving interval problem. If prostaglandin F2 alpha injections shorten this period, then farmers everywhere can take advantage of this technique. The drug is already used in cattle for other purposes and it is inexpensive and easy to administer. The Penn researchers hope to have some definitive results at the end of the study.

Dr. Love is a graduate of the University of Missouri School of Veterinary Medicine. He came to Penn in 1985 as a resident and in 1987 was appointed lecturer in reproduction. The co-investigators are Dr. Grant S. Frazer, Dr. J. D. Ferguson and Dr. Elaine D. Watson.

Hookworm Disease Workshop

A workshop entitled "Hookworm Disease: Current Status and New Directions" was recently held at the Rockefeller Foundation Study and Conference Center in Bellagio, Italy. The workshop, which celebrated the 75th anniversary of the first international venture by the Rockefeller Foundation in hookworm control, was jointly organized by Dr. K.S. Warren (Rockefeller Foundation) and Dr. Gerhard A. Schad, professor of parasitology at the School. Dr. Schad's involvement in this workshop was in recognition of his unquestioned status as the "foremost authority in the United States on hookworms and hookworm infection."

Hookworms are nematodes and there are two important species that parasitize the human intestine; *Ancylostoma duodenale* and *Necator americanus*. The parasite is characteristic of rural areas in tropical

and subtropical regions. The infective larvae are typically found in the soil around defecation sites and enter the host either by direct penetration of bare skin (both species) or by accidental ingestion (*Ancylostoma* only). The adult worms are blood feeders and prolonged infections with large numbers of parasites lead to iron deficiency anaemia, malabsorption and a loss of protein. The infection in children may lead to a profound impairment in physical and cognitive development. Although *N. americanus* originates from Africa, it was first described in the southern states of the USA, and it was here that the Rockefeller Foundation first became involved with hookworm disease and plans for "mitigating its evils." In subsequent years, the Foundation broadened its efforts to encompass other countries, particularly those under the jurisdiction of the old British Colonial Office. However, despite these early intensive attempts at control, hookworm is still a significant public health problem in many parts of the world. In the endemic areas of China, for example, it was recently found that between 30 percent and 50 percent of people tested were infected with one or both species of hookworm.

The participants of the Bellagio workshop listed a number of recent advances in our knowledge of hookworm disease that had proved particularly useful in our efforts to control the infection. Dr. Schad's research figured prominently in that list. His epidemiological studies of hookworm infection in India are seminal works. They provided the first evidence that *A. duodenale* may cease development in its human host for several months at a time. The occurrence of arrested development in *A. duodenale*

but not *N. americanus* explains perplexing differences between the population biology of the two species and has significant implications for the organization of control programs since arrested larvae are notoriously difficult to kill using conventional anthelmintic drugs. Dr. Schad's work also provided a dramatic experimental demonstration that some individuals are consistently more predisposed to infection with hookworms than others. This gave renewed impetus to the old idea of selective chemotherapy as a cost effective control strategy and prompted others to conduct similar studies on other gastrointestinal nematode parasites of man. The data from these field studies continue to be analyzed and have been the basis of a number of international collaborative research efforts, but represent only a fraction of Dr. Schad's contribution to our understanding of hookworm disease. His research group, for example, has been the only one to maintain *A. duodenale* in a laboratory animal model for more than just a handful of parasite generations. They are now actively involved in the laboratory investigation of the infective process in hookworms. This process remains essentially unknown and if understood could open important new opportunities for prevention and control of hookworm infection.

The Bellagio workshop involved twenty-five speakers from ten countries. In addition to Dr. Schad, Dr. Gary Smith, assistant professor of population biology and epidemiology, participated in the workshop. The proceedings have been reported in *Nature*, *the Lancet*, have stimulated the preparation of a news story about hookworms in *Science*, and will appear later in book form.



Hookworm

Cardiac Pacemakers for Pets

Cardiac pacemakers enable many people to lead active lives. Animals are also benefitting from this technology. A number of dogs and cats each year receive a pacemaker, and a few years ago such a device was implanted into a horse at Penn's New Bolton Center, enabling it to compete as a jumper once again.

Here at VHUP five to six pacemakers are implanted annually into dogs and cats. "A few of the pacemakers are willed to us, others are received from pathologists who have recovered them from human patients at autopsy with permission of the family," said Dr. Malcolm MacDonald. "Frequently families are not aware that a pacemaker can be re-used in a pet or a human patient in the Third World. The devices often have six to eight years of battery life left and it seems a shame to not re-use them. Once families are told that the pacemaker can be used to help others, they give permission to have it removed and donated." The program to send used pacemakers either to veterinary schools or to Third World countries is organized by a group of pathologists.

Pacemakers are small, about the size of a cigarette lighter, with a battery life of about twelve years. Once the battery runs down, the device must be replaced. Most pacemakers are set at a specific pacing rate which never changes. More sophisticated models increase the number of beats as the patient's activity increases. The shorter battery life of recycled pacemakers implanted in animals is rarely a problem since their life-spans are relatively short compared to that of a human being.

Pacemakers are not a panacea for all heart problems. They can only help if the patient has certain heart rhythm problems due to disease of the pacing area or conduction system of the heart. These areas regulate the electric stimuli causing contractions of the heart muscle and the subsequent pumping action. Diseases or other abnormalities of the electrical conducting system can cause heart block. The patient develops irregular heart rhythm and may faint. One particular condition occurs in people and animals, and is seen quite often in miniature schnauzers (sick sinus syndrome).

"Our patients are primarily middle-aged and elderly dogs," said Dr. MacDonald. "To be a candidate for the pacemaker, the animal has to be in reasonably good health with no other serious health problems. Usually a pacemaker allows a dog a normal life for a number of years before age-related other disorders set in."

The implantation surgery is fairly routine and can

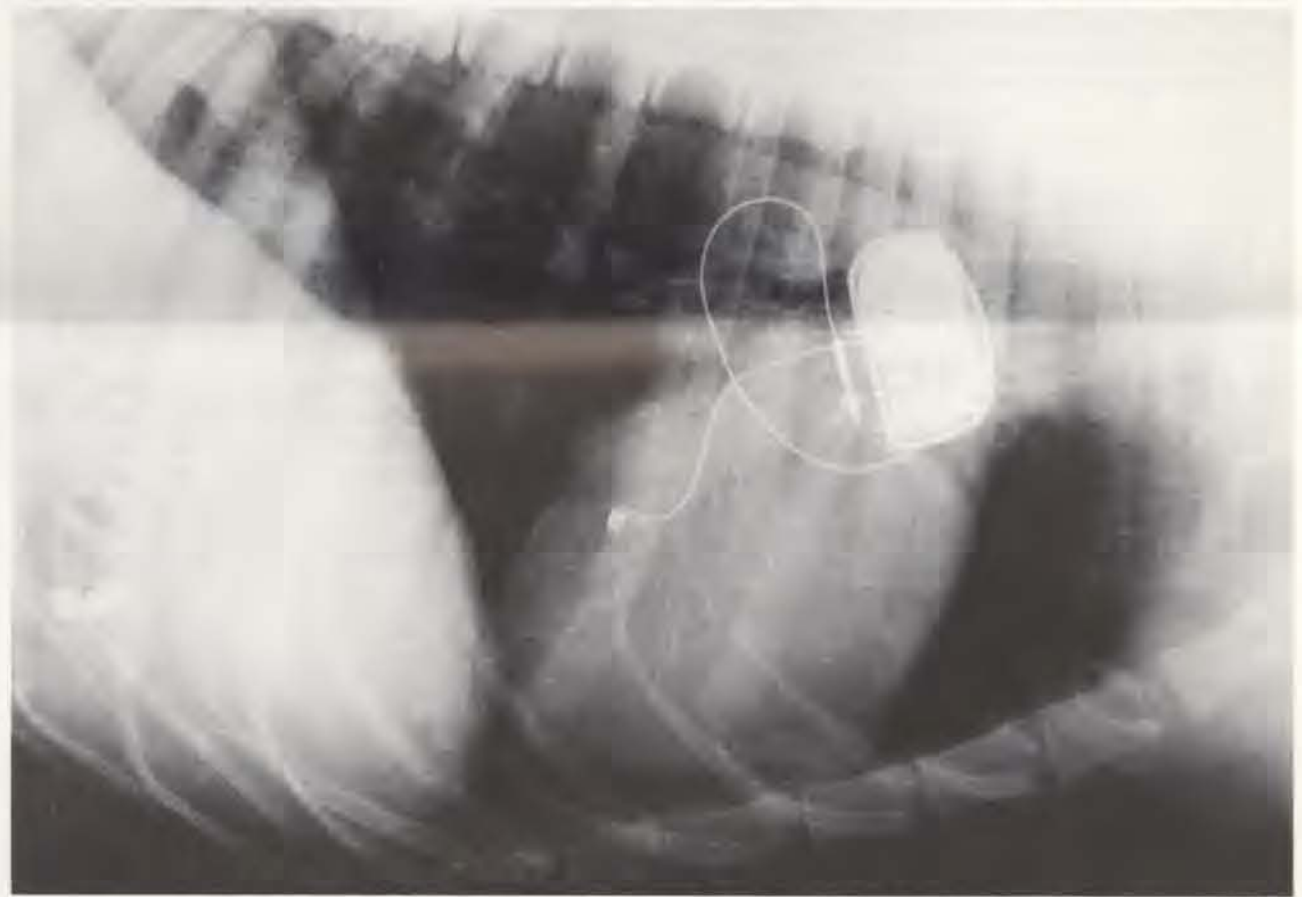
be done as chest surgery or through a vein. The preferred technique in dogs is to attach the electrode directly to the outside of the heart and place the pulse generator in the abdomen or subcutaneously (under the skin). In small dogs the heart can be reached through the diaphragm, while in large dogs the heart is reached through the thoracic (chest) wall. Another technique is to thread the electrode catheter through a vein and implant it into the right ventricle. The pulse generator is implanted subcutaneously and connected to the electrode which transmits the electric impulses to the heart muscle. In either case, the pacemaker is securely fastened. Secure fastening is important as pacemakers can become detached and then migrate, potentially resulting in pacemaker failure. In man, where body motion can be more controlled, transvenous approach is more often used.

For dogs the pace is set at approximately 100 beats a minute. "The normal heart rate of most dogs varies with size, 60 to 160 beats per minute," said Dr.

MacDonald. "In bigger dogs the heart rate is toward the lower end, while the hearts of smaller dogs beat faster. The figure of 100 was arrived at to permit the animal some activity. Dr. Buchanan, professor of cardiology at the School, chose it when he successfully implanted the first pacemaker into a clinical canine patient in the 1967. That dog, a Basenji, required a second pacemaker because the battery ran low after the first five years."

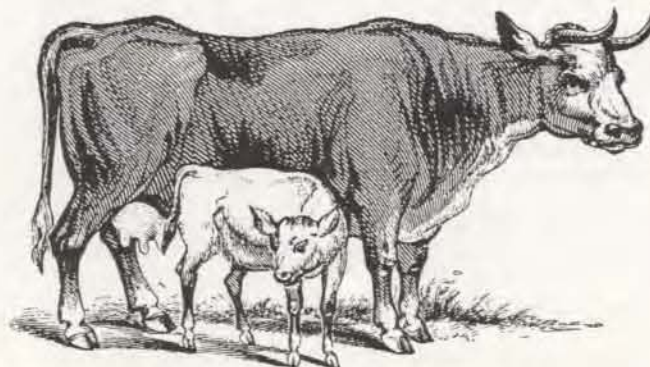
Dr. MacDonald explained that, while expensive, implanting a pacemaker into a canine or feline patient is a realistic approach. "It allows the animal to live a longer normal life. It is also rewarding to the veterinarian as the improvement of the patient is dramatic." At this point pacemaker implants are performed mostly at veterinary schools and a few specialized practices. The majority of patients are dogs as pacing area disorders are rare in cats.

Dr. MacDonald, a veterinarian from England, is completing his residency in cardiology at VHUP.



Veterinary Medicine on TV

"The Gentle Doctor", a series of 13 half-hour programs, depicting all aspects of veterinary medicine, is coming to local PBS stations. The show was produced in Florida. A number of Penn faculty and staff were interviewed for the series. Look for them in the following segments: Women in Veterinary Medicine, Avian Medicine, Veterinary Ophthalmology, Animals In Laboratory Research, Aquatic Mammal Medicine, and Animal Behavior. Call your local PBS station to find out when the series will be shown in your area.



New Dairy Facility

Ground will be broken soon for the Mark W. Allam Center for Dairy Cattle Research and Teaching. The Center will serve as a modern and sophisticated environment for veterinary and graduate students interested in the medical and managerial aspects of dairying; a regional resource for the dairy industry; and a laboratory for veterinary medical researchers in fields such as epidemiology and preventive medicine, nutrition, reproduction, infectious and chronic diseases, and dairy cattle economics. Funds for the building at New Bolton Center are being provided through gifts from individuals and corporations as well as through appropriations from the Commonwealth of Pennsylvania.

Rosettes & Ribbons

Dean Edwin J. Andrews (V'67) presented a keynote address at the AVMA Forum on Veterinary Perspectives on Genetically Engineered Animals. **Dr. John H. Wolfe**, assistant professor of pathology, and **Dr. Sberbyn W. Ostrich (V'63)** also presented papers at the two-day event in Washington, D.C. **Dr. Andrews** was also the keynote speaker at the 321st dinner of the New York Farmers.

Dr. David H. Knight has been promoted to professor of cardiology.

The annual "Warm Fuzzy Award" was presented to **Dr. Robert J. Orsher (V'79)**, assistant professor of surgery, during the resident and intern picnic at the Philadelphia Zoo. The award is given by the four area veterinary medical associations to honor a faculty or staff member who has contributed greatly to client and referral practitioner relationships.

Dr. Elaine D. Watson, assistant professor of reproduction, is the recipient of the Richard Hartley Clinical Prize, presented in recognition of scholarship in publications during the past year.

The Pharmaceutical Manufacturers Association Foundation, Inc. has chosen **Dr. Deborah Gillette**, assistant professor of pathology, for an award in the 1989 Faculty Development Award in the Toxicologic-Pathology program. The award is for a two-year period, beginning July 1989.

Dr. E. Neil Moore, professor of physiology, and **Joel Morganroth, M.D.**, co-edited *Silent Myocardial Ischemia*, a book just published by Kluwer Academic Publishers, Boston. **Dr. Moore** was elected to the Board of Governor's of the Likoff Cardiovascular Research Institute, affiliated with Hahnemann University Medical School and Hospital. In October he co-directed a two-day symposium on "Thrombolytic and lipid lowering agents" at the Four Seasons Hotel, Philadelphia, and presented a talk on "Inter-relationships of thrombolytic agents with sudden cardiac death." **Dr. Moore** also presented a talk entitled "Basic electrophysiological mechanisms of cardiac arrhythmias" at an American College of Cardiology Symposium on interpretation and treatment of cardiac arrhythmias, held in Philadelphia in December.

Dr. Patricia Sertich (V'83), lecturer in reproduction, and **Dr. Phillip Hunt (V'82)**, lecturer in reproduction, passed their board examinations and are now diplomates in the American College of Theriogenology. During the summer, **Dr. Sertich** presented a paper entitled "Periparturient events in the ovariectomized embryo transfer recipient" at the 11th International Congress on Animal Reproduction and Artificial Insemination, held in Dublin, Ireland. She also presented papers on "Equine embryo transfer" and "Equine oocyte collection" at the 100th Anniversary Agricultural Research Conference, held at the University of Krakow, Poland.

Dr. Gary Smith, assistant professor of population biology and epidemiology, has received funding from MSD AGVET, a division of Merck and Co., to conduct research on "A mathematical model for evaluating epidemiological data on bovine helminthiasis in North and South America."

Dr. William Medway, emeritus professor of clinical laboratory medicine, addressed the fall meeting of the College of American Pathologists on veterinary clinical pathology. The meeting was held in October in Las Vegas. **Dr. Medway** organized a short course on Captive Marine Mammal Biology and Husbandry for APHIS inspectors. The course, sponsored jointly by the Marine Mammal Commission and the Animal and Plant Health Inspection Service (APHIS) of the USDA, was held in Orlando, FL in November. **Dr. Joseph R. Geraci (V'61)** assisted in the planning of the course. **Dr. Medway** also attended the Oceans '88 "Unusual Environmental Events Symposium" in Baltimore where he addressed the group on "The dolphin die-off" which occurred on the New Jersey coast during the summer of 1987.



Dr. John T. McGrath (V'43), emeritus professor of pathology, received the 1988 PVMA Distinguished Veterinarian Award for his 45 years as teacher, scholar and researcher.

The PVMA Award of Merit was presented to **Dr. David K. Rice (V'45)**. He was cited for his 20 years of service as a commissioner for Warren County.

Dr. Robert J. Rutman, emeritus professor of biochemistry, presented a lecture at the 40th Anniversary Celebration of the University of Ibadan, Nigeria.

Dr. Robert B. Altman, adjunct assistant professor of zoological medicine, received the Outstanding Service to Veterinary Medicine Award, presented by the New York State Veterinary Medical Society.

Dr. Gail K. Smith (V'74), associate professor of orthopedic surgery, and **Dr. Darryl N. Biery**, professor of radiology, presented a paper, "Hip Dysplasia: Biomechanical and radiographic correlations," at the 8th Meeting of the International Veterinary Radiology Association, held in Sydney, Australia in August. **Dr. Jeffrey K. Wortman (V'69)**, associate professor of radiology, presented a paper, "A high speed high detail film/screen combination for avian radiography," at the same meeting. **Dr. H.M. Saunders (V'81)**, lecturer in radiology, also presented a paper here. It was on "Ultrasound detection of canine chronic active pancreatitis: 15 clinical cases." **Dr. Paul G. Orsini**, lecturer in surgery, also presented a talk at this meeting.

Dr. Colin Johnstone, associate professor of parasitology in epidemiology and health economics, was the featured speaker at the annual Farm-City banquet in Chester County.

Dr. Adrian R. Morrison, professor of anatomy and head, laboratories of anatomy, has been elected secretary-general of the newly formed World Federation of Sleep Research Societies.

Drs. Biery, Saunders and Wortman, and **Dr. Sydney M. Evans (V'77)**, assistant professor of radiology, conducted a "Chest and abdominal radiographic interpretation workshop" at the Scientific Program of the First Joint Meeting of the Pennsylvania and Maryland Medical Associations held in Atlantic City in October. In addition, **Dr. Wortman** also presented a lecture, as did **Dr. Nathan L. Dykes**, resident in radiology. Veterinary faculty also participated in the 1988 American College of Veterinary Radiology Meeting and Veterinary Ultrasonography Symposium, held in Washington, D.C. Here **Dr. David H. Knight**, professor of cardiology, and **Dr. Mark H. Saunders**, presented papers on echocardiography and ultrasonography. **Dr. Wortman** made a presentation in the nuclear medicine section of the meeting, and **Dr. Sydney Evans** made a presentation in the radiation oncology section.

The Seeing Eye, Inc., through the Morris Animal Foundation, is funding a continuing examination of early diagnosis of hip dysplasia, conducted by **Dr. Gail Smith** and **Dr. Darryl Biery**.

Dr. Wendy Vaala (V'80), lecturer in large animal medicine, successfully completed her American College of Veterinary Internal Medicine Certifying Examination and is now board certified in the specialty of internal medicine.

Dr. Wilbur B. Amand (V'66), adjunct professor of zoological medicine, has been appointed chairperson of the Zoological Animals Committee of the United States Animal Health Association.

Dr. M. Josephine Deubler (V'38), is one of the nominees for the Outstanding Contributions By An Individual Award, as is **Walter Goodman**, a member of the School's Board of Overseers. This award, one of eight achievement awards, is presented annually at the Tournament of Champions in March.

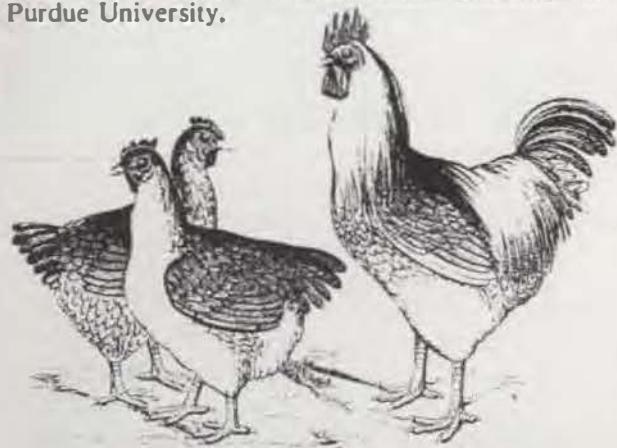
A number of members of the laboratory of pathology attended the recent Annual Meeting of the American Society of Tropical Medicine and Hygiene in Washington, D.C. **Dr. James Lok**, assistant professor of parasitology, and his students and colleagues presented three papers concerned with filariasis and onchocerciasis. Graduate students in parasitology, **John Hawdon** and **Linda Aiken (V'78)** also had presentations accepted. **Dr. Gerbard Schad**, professor of parasitology, participated in a major symposium honoring Paul Beaver, editor emeritus of the *American Journal of Tropical Medicine*. Another speaker in this program was **Dr. Peter Schantz (V'65)**, head of parasitology at C.D.C.



Some members of the Class of '53 got together in Aspen, CO as a continuation of the class reunion. Travelling to Colorado were Dr. Robert E.L. Probasco, Dr. John O. Mason, Dr. Amos P. Hollister, Dr. E. Jefferies Hathaway, and their respective wives, Doris, June Ethel, and Jackie. They met with Dr. Paul W. Husted, professor of small animal medicine at Colorado State University.

A refurbished locker room at Franklin Field is named in honor of Dr. Frank Owens (V'34) and his wife. Their two sons who are Penn alumni, and their two grandchildren, current Penn students, donated the monies needed for the renovation.

Dr. Lawrence T. Glickman (V'72) was appointed head of the department of veterinary pathology at Purdue University.



Dr. Charles E. Benson, professor of microbiology, has been named head of the laboratory of microbiology and immunology. He spent a portion of his sabbatical leave in the Plasmid Research Laboratory at the Royal Infirmary of the University of Glasgow as a senior honorary research fellow. Dr. Benson and Dr. Robert Eckroade, associate professor of poultry pathology, participated in a seminar on *Salmonella enteritidis* in poultry at the Annual Meeting of the American Society for Microbiology in Miami, FL. The two investigators have co-authored papers at the North East Conference on Avian Diseases on the epidemiology of *Salmonella enteritidis* infections in chickens and presentation on the pathogenic characteristics of *S. enteritidis* at the joint AVMA/AAAP meeting in Portland, OR. Both participated in the New York Conference of *S. enteritidis* in Albany through formal presentations and round table discussions. Drs. Benson and Eckroade were members of the USDA Task Force on *Salmonella enteritidis* in eggs, and Dr. Benson represented the two laboratories in a co-sponsored FDA/USDA public hearing in Washington, D.C. on *Salmonella enteritidis* in eggs. The two are co-investigators on a research grant on the Pathogenesis of *S. enteritidis* in chickens, funded through the Fair Funds of the Department of Agriculture of the Commonwealth of Pennsylvania. Dr. Eckroade was senior author of a presentation with Dr. Benson on the Epidemiology of *Salmonella enteritidis* at the annual meeting of the U.S. Animal Health Association in Reno, NV.

Dr. Benson is co-investigator with Dr. Helen M. Acland, associate professor of pathology, Dr. Wendy Freeman (V'85), lecturer in field service, and Dr. Linda Keller, research assistant professor of poultry pathology, on a project to study the incidence of Ovine Progressive Pneumonia in Pennsylvania. This investigation has received a three-year grant from the Pennsylvania Department of Agriculture.

Dr. Jonathan E. Palmer (V'77), assistant professor of medicine, and Dr. Benson, have published, in the *Veterinary Record*, the first report documenting experimental oral transmission of the Potomac Horse Fever agent (*Ehrlichia risticii*).

Dr. Roselyn J. Eisenberg, professor of microbiology, and Dr. Wesley C. Wilcox, professor of microbiology, also attended the 13th International Herpesvirus workshop and co-authored a presentation on "A temperature sensitive phenotype exhibited by Herpes simplex virus glycoprotein D-cysteine mutants." Dr. Eisenberg was co-author on three additional presentations at this meeting and was the chairperson of the session on glycoproteins. She was invited to speak on Herpes simplex glycoproteins at the Squibb Institute for Medical Research in Princeton, NJ. Dr. Eisenberg has published four papers since June in the *Journal of Virology* on various aspects of the glycoproteins on Herpes simplex virus and has been awarded, along with her co-investigator Dr. Gary Cohen of the School of Dental Medicine, University of Pennsylvania, three U.S. patents on the use of glycoprotein D of Herpes simplex virus as a human subunit vaccine and the development of monoclonal antibodies in the detection of the subunit proteins. During June, Dr. Eisenberg served on the NIH-sponsored Experimental Virology Study Unit.

Drs. William Lawrence (V'59) and Leonard Bello co-authored with J.C. Whitbeck, a paper entitled "Comparison of the Bovine Herpesvirus 1 gI gene and the Herpes simplex virus type 1 gB gene" in the *Journal of Virology*. In addition, Drs. Lawrence and Bello attended the 13th International Herpesvirus Workshop during August in Irvine, CA where they presented a paper. They also delivered a paper at the Second International Bovine Herpesvirus Meeting in San Diego, CA. This research team has received funds from the U.S. Department of Agriculture for their research proposal "Bovine Herpesvirus recombinants expressing genes of Bovine Respiratory viruses."

Dr. Benjamin Wolf, professor of microbiology, Dr. Gert W. Niebauer, assistant professor of surgery, Dr. Dean Richardson, assistant professor of surgery, and Dr. Yarmush (MIT) co-authored "Evaluation of immune complexes and collagen type-specific antibodies in sera and synovial fluids of horses with secondary osteoarthritis" which appears in the *American Journal of Veterinary Research*.

Dr. Elizabeth Atwood Lawrence (V'56), is the recipient of the 1988 Outstanding Woman Veterinarian of the Year Award. The award was presented by the Association for Women Veterinarians at the AVMA meeting in July. It is given for "sustained professional excellence and achievement in the field of veterinary medicine." Dr. Lawrence is the recipient of a Mount Holyoke College Sesquicentennial Award presented on the occasion of the college's 100th anniversary to 50 alumnae from around the world. In 1987, Dr. Lawrence received the Bustad Companion Animal Veterinarian of the Year Award for Massachusetts. An associate professor in the department of environmental studies at Tufts University, Dr. Lawrence, a veterinarian and a cultural anthropologist, combines these two fields in her teaching and research in the field of human-animal relationships.

In November, 1989, Mrs. Lois Goglia, wife of Dr. Edward Goglia (V'66), and Dr. Robert Carlton (V'45), will participate in a joint exhibit at the University of Pennsylvania Faculty Club. Mrs. Goglia creates canvases from various surgical materials, e.g., drapes, radiographs, suture material, and Dr. Carlton fashions marble sculptures.

Dr. Colin E. Harvey, professor of surgery, participated in the Fifth Annual Warm Weather Specialty Meeting of the American Association of Feline Practitioners in October in Boston.

The Commission on Life Sciences of the National Research Council has appointed Dr. Lawrence Soma (V'57), professor of anesthesia, as a member of the Institute of Laboratory Animal Resources Committee on Pain and Distress in Laboratory Animals. This committee will prepare a handbook which will include guidance on recognition of the signs of pain and distress in the commonly used laboratory animals, as well as on pharmacological and nonpharmacological approaches to avoid or relieve pain and distress. Dr. Soma has also been appointed a member of the Committee on Ethics of Animal Experimentation, sponsored by the Hastings Center.

Appropriations from the Commonwealth of Pennsylvania to the School of Veterinary Medicine for 1988/89 increased by 9.4 percent to \$14,755,000. Of this \$7,481,000 are earmarked for veterinary instructions, \$3,509,000 for New Bolton Center, \$1,890,000 for Food and Animal Clinics, \$1,153,000 for the Center for Animal Health and Productivity, \$322,000 for the Allam Dairy Facility, and \$400,000 for an incinerator at New Bolton Center. The overall appropriations to the University were \$36,347,000, representing an increase of 6.8 percent over last year.

Raker Scholar

Dr. Dean Richardson, assistant professor of surgery, has been named the first Charles W. Raker Scholar in Equine Surgery. Funds are still being raised to fully endow the Raker Chair. The interest from the funds already on hand is being used to support designated Charles W. Raker Scholars, outstanding junior faculty members with significant potential as future academicians/clinicians. The one-year appointment is renewable.

Dr. Richardson has special clinical interest in orthopaedics. Arthroscopy and the internal fixation of fractures comprise a large portion of his caseload, and his research focuses on the biochemical evaluation of models of equine joint disease and the study of the pathogenesis and treatment of naturally-occurring traumatic joint disease.



Dr. James W. Buchanan, professor of cardiology, accepting the Merck Animal Health Education Grant from Dr. Raymond E. Plue of Merck Sharp & Dohme Research Laboratories while Dr. Darryl N. Biery, professor of radiology and chairman, department of clinical studies (Philadelphia) looks on. The grant, awarded by The Merck Company Foundation, will be applied toward the purchase of a heart and lung sound recording and broadcasting system which will be used to teach the art and science of auscultation to veterinary students.

Developing Gene Therapy

Researchers at the University of Pennsylvania School of Veterinary Medicine are testing methods for transferring normal genes into the cells of animals affected by enzyme deficiencies that cause severe and often fatal disorders in both humans and animals.

The enzyme deficiency diseases, called mucopolysaccharidoses, or MPS diseases, are progressive degenerative disorders of children and young animals usually characterized by severe bone abnormalities, heart defects, impaired vision, mental retardation, and premature death. The diseases are caused by deficiencies in enzymes whose normal function is to break down specific molecules in the cell.

The current research at Penn has focused on developing and testing vectors, or carriers, that can successfully deliver healthy enzyme genes into MPS affected cells.

In a presentation in Washington, D.C. at the American Veterinary Medical Association conference on genetic engineering, Dr. John Wolfe of the Gene Therapy Research Group at Penn said the group had developed a vector that is an effective carrier for one of the healthy genes. When transferred, the gene corrected the abnormalities of the diseased cell.

"The preliminary tests indicate that retroviral vector gene transfer may be a feasible approach for treating MPS diseases," Wolfe said.

Retroviral vectors act as a delivery system for placing the normal gene into the diseased cell. Retroviruses have proven to be good carriers, Wolfe said, because they are capable of inserting the gene into the DNA of the host cell, and they are relatively simple viruses that have been extensively modified so they do not harm the cells in which they are placed.

The initial testing, which has taken place within the last six to eight months, has been performed in tissue culture using diseased cells from animals affected

with an MPS disorder, Wolfe said. The newly-developed vectors have been able to transfer the gene to MPS cells, where the transferred gene has corrected the defect in the diseased cells.

The work at Penn has been performed in collaboration with the Memorial Sloan-Kettering Cancer Center and the Mt. Sinai School of Medicine in New York.

The next step, Wolfe said, will be to begin testing to determine if the vectors can be transferred to and function in diseased animals to actually alter the course of the disease.

Although MPS disorders are quite rare in the general population, they often occur with high frequency within families that carry the defective gene. Besides the MPS disorders, there are several thousand other forms of genetic disease. Effective treatments are available now for only a few of those disorders. Many researchers believe the new field of gene therapy research offers an approach to the treatment of previously incurable genetic disorders of animals and humans.

In gene therapy, Wolfe explained, cells are removed from the patient and placed into tissue culture; the normal gene is inserted; and the corrected cells are returned to the patient.

"It is replacing something that is missing from the cell," Wolfe said. "In effect, it is similar to giving insulin for the treatment of diabetes. However, unlike insulin, the effect of the gene therapy treatment would be permanent."

Researchers face several challenges in achieving successful gene therapy. The gene involved in the disease must be identified — which has not yet been accomplished for many genetic diseases; the gene must be cloned, or duplicated; an effective vector, or delivery system, must be constructed to transfer the new gene into the diseased cells; the vector must be capable of transferring the gene to the correct target cell; the transferred gene must function correctly



Dog with MPS VII

once it reaches the diseased cell; and, finally, the transferred gene must be able to cure or substantially alter the course of the disease for gene therapy to be considered successful.

The MPS diseases are good subjects for gene therapy research because the defective genes have been identified and can be duplicated. And, Wolfe said, since the MPS diseases that occur in animals are very similar to those that occur in humans, what is learned from studying the MPS affected animals should be highly applicable to treating the diseases in humans.

"This is a good example of reciprocal benefit in human and animal medicine," Wolfe said. MPS was first discovered in humans, and that led to its discovery in animals.

"The information and benefits flow back and forth between animal and human medicine."

Phyllis Holtzman

Equine Symposium for Students

Students organized an all-day equine symposium, consisting of hands-on demonstrations and lectures on November 19. The topics offered in the presentations and laboratories were: familiarization with the YAG Laser; cytology; cardiology and useful equipment; semen handling and processing; embryo transfer; mare reproductive tract; oblique radiographs for common equine problems; neonatal intensive care; lameness diagnosis; principles of internal fixation; low power laser and acupuncture; diagnostic ultrasound of the equine limb; colic; and endoscopy. In the afternoon a lecture on the prepurchase exam and its legal implications was presented. The following clinicians and residents participated and volunteered their time for event: Dr. Eric Tulleners, Dr. Ellen Ziemer, Dr. Johanna Reimer, Dr. Charles Love, Dr. Patricia Sertich, Dr. Martin Burton, Dr. Curtis Schelling, Dr. Wendy Vaala, Dr. Dan Dreyfuss, Dr. James Orsini, Dr. Benson Martin, Dr. Virginia Reef, Dr. Janet Johnston, Dr. Alan Ruggles, Dr. Yves Rossier, Dr. Lin Klein, Dr. William Moyer, and Dr. James Wilson.



SCAVMA Activities

The second annual Student Teaching Awards Dinner will be held on Sunday, April 2, 1989, 6:00 pm at the Hotel DuPont in Wilmington, DE. Tickets will be \$17.00 each for students and \$30.00 each for faculty. Look for the invitations in the mail. Last year 200 students and 150 faculty, staff and alumni attended the dinner at Longwood Gardens. All enjoyed the feast and ceremonies and are looking forward to this year's event.

SCAVMA's annual December auction exceeded all expectations. Support was tremendous. \$9,000 were raised. The funds will be used by the Faculty/SCAVMA fund to provide money for the student emergency loan fund. Part of the proceeds will help defray the cost of student tickets to the Dinner Dance.

Bigger and better than ever—SCAVMA's latest fund raising effort is a 'Boutique' in the student lounge. It offers a great selection of sweatshirts, sweatpants, T-shirts, jogging shorts, mugs and can coolers—available in a variety of colors and graphic designs. Also beginning in January, merchandise will be available at New Bolton Center in the cafeteria on Fridays.

This year's SCAVMA student symposium will be held at North Carolina State University, in Raleigh-Durham. Approximately 80 students from Penn will participate in the event. Funds raised by SCAVMA throughout the year will be used to defray the costs of transportation and accommodations.



Animal Crackers

Eye Clinic

Inherited eye diseases are a problem in dogs and concerned breeders are making an effort to eliminate affected dogs from their breeding programs.

PRA (*Progressive Retinal Atrophy*) is known to be recessively inherited. This term covers a number of diseases of the retina which are clinically similar and eventually result in blindness. The age at which diagnosis can be made is specific for the breed affected. It may be before one year of age or as late as five years of age.

Many cataracts (opacity of the lens) are inherited but some may be associated with systemic diseases such as *diabetes mellitus*, or with injuries. There is no way to predict how rapidly a cataract will progress and there is no known medicine, treatment or diet which will slow down or prevent the progression of a cataract. Surgery, usually performed on only one eye, restores vision in most cases.

Entropion and *Ectropion*, conditions in which the eyelids turn in or turn out, may be inherited. They cause irritation and may be corrected surgically. It should be noted that the American Kennel Club's rules state that if a dog's appearance has been changed by artificial means, it is not eligible to compete at championship shows. Eyelid surgery would make a dog ineligible for A.K.C. shows.

Some of the individual breed standards have disqualifications, but these refer to the color of the eyes, or eyes of different colors. However, there are standards which state that eyes of different colors are acceptable.

Eye clinics are held in different areas and many eye problems can be detected in these. The clinics provide a mass screening method for the diagnosis of the major inherited eye problems. Because of the organizational nature of most eye clinics, only those diseases recognized with conventional ophthalmologic instruments (indirect ophthalmoscope, slit-lamp microscope) can be detected. Those diseases that need special instrumentation for recognition or early diagnosis, [e.g., *mesodermal dysgenesis of the irido-corneal angle* (gonioscopy); *mild microphthalmia* (ultrasound); early diagnosis of PRA (electroretinography)] require examination methods not available at screening eye clinics.

The equipment and services needed for routine and specialized diagnosis of inherited eye problems is available as a clinic service provided by the Inherited Eye Disease Studies Unit (IESDU) at the Veterinary Hospital of the University of Pennsylvania. In addition, the IESDU Staff is actively engaged in a research program on inherited eye diseases in dogs, cats, etc.

Further information can be obtained from

Dr. Gustavo D. Aguirre,
Professor of Ophthalmology
Director, Inherited Eye Disease Studies Unit,
Section of Medical Genetics
School of Veterinary Medicine
3850 Spruce Street
Philadelphia, PA 19104

Coccidiosis

Coccidia are protozoan parasites frequently found in fecal specimens, although this does not necessarily indicate disease. *Coccidiosis* should be diagnosed only if there are clinical signs.

Most of the coccidia are host specific. At least 20 species infect dogs and cats, and there are many species in most domestic animals. *Coccidiosis* is economically important in cattle and chickens. One species in rabbits causes severe liver disease.

The life cycle is direct, so good sanitation is important. Feces should be removed frequently along with bedding, and fecal contamination of food and water must be avoided. The usual signs of *coccidiosis* are diarrhea (sometimes bloody), weight loss and dehydration. Young puppies and kittens are most severely affected. Outbreaks can be controlled with sulfonamide drugs. In most cases, *coccidiosis* is not highly pathogenic.

Coccidioidomycosis is an entirely different disease caused by a fungus so-named because it resembles coccidia. It is a systemic disease, involving the lungs, lymph nodes and other organs. It is limited to certain geographic regions with low latitudes, hot summers and mild, moderately wet winters. The fungus is found in the soil of some of our southwestern states and in parts of Central and South America.



Molossus

Molossus is a general term referring to large, mastiff-type breeds which have been known since ancient times. They are large dogs used for hunting and guarding.

The American Kennel Club recognizes Mastiffs and Bullmastiffs. The Mastiff is more properly described as the *Old English Mastiff*. It is the larger of the two breeds and has been bred in England for over two thousand years as a watch dog. There is a story that a Mastiff guarded Sir Piers Legh when he fell at the Battle of Agincourt (1415 A.D.). The famous Lyme Hall strain descends from this bitch. The Mastiff breed standard describes it as "a combination of grandeur and good nature, courage and docility."

The Bullmastiff is smaller than the Mastiff and was developed in England by crossing the Mastiff and Bulldog. They were used to protect the large estates from poachers. The gamekeepers wanted dogs that would remain silent at the approach of poachers, then throw and hold, but not maul. The Bullmastiff is powerfully built and active, fearless yet docile.

Molossus breeds appear frequently at rare breed shows. The Neapolitan Mastiff is descended from the Roman Molossus. Almost extinct following World War II, it is enjoying a revival, especially in Italy. These dogs have a large head with dewlaps hanging in great fold to the neck. Their ears are cropped. Their movement is described as slow, free and bear-like but they cover distances easily at a trot. The Spanish Mastiff (Mastiff of La Mancha) has been used to guard sheep and cattle and is excellent at hunting large game. The Tibetan Mastiff has been mentioned in the writings of Aristotle and Marco Polo. It is

nearly extinct in Tibet, but some were imported to the United States in the 1960's and they are increasing in numbers here. Other molossoid breeds are the Dogue De Bordeaux and the Fila Brasileiro, the most popular breed in Brazil.

These large breeds are not suitable for most households. They are good guard dogs and their nature must be understood by their owners. They need the proper environment and must have proper training. Study them carefully before you consider owning one.

The Mastiff and Bullmastiff Handbook by Douglas B. Oliff (Howell Book House) is highly recommended reading for those who are interested in the history and characteristics of these breeds.

The Neapolitan Mastiff (Italian Mastino) by Mario Zacchi has been translated from the Italian and an English Edition is available from some booksellers. "Faithful friend to his master, Dreadful Cerberus to the stranger." This is a book for the connoisseur of the molossian.

Health Insurance

Health and Accident Insurance for dogs and cats now is available in many states. The cost of veterinary services can be very high, especially for accident cases and serious illness. Insurance coverage can mean peace of mind if expensive treatment is needed.

The premiums average about \$100 annually per animal. Usually there is a deductible which may range from \$20 to \$250. Plans may pay benefits of \$750 to \$2500 per illness or injury.

Be sure to read the fine print. Policies usually do not cover pre-existing conditions, vaccinations, elective procedures such as spraying and neutering, routine teeth cleaning, congenital or hereditary defects and treatment for parasites.

Your veterinarian should be able to give additional information on insurance which is available. It can be a great help if there is a catastrophic illness.

Veterinary Students

At the University of Pennsylvania School of Veterinary Medicine, there are 419 students in the four classes. The class of 1992 which entered in September 1988, has 105 members, 72 female and 33 male. In the entire student body, there are 288 women and 131 men.

The number of qualified applicants has been decreasing and this is of some concern. There are 489 applicants for the class entering in 1989, a slight increase over the 475 applying in 1988. One of the problems is tuition. For residents of Pennsylvania (70% of the class) and those from contract states — New Jersey (15), Maryland (4), Connecticut (2), Delaware (2), Vermont (2), New Hampshire (1), Maine (1 every other year) and Puerto Rico (1 every other year) — tuition is \$11,943.00 plus a general fee of \$620.00 — a total of \$12,563.00. For the 8 or 9 students from other states or countries, the tuition is \$14,319.00 plus the \$620.00 general fee — a total of \$14,939.00. Scholarship endowment needs to be increased.

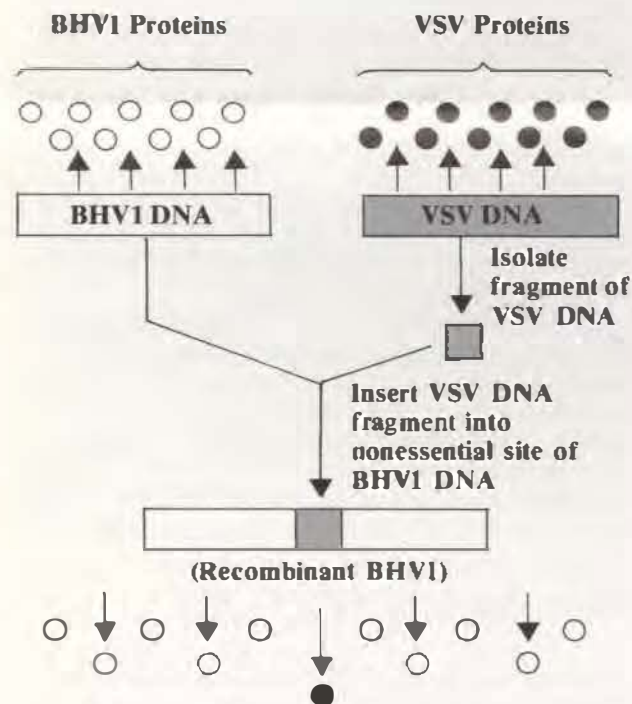
There are places for 109 students in each class. There are very few drop-outs. At present, there are 103 students in the Class of 1989.

Pathobiology continued from page 1

immune system produces antibodies in reaction to proteins contained in the virus. The antibodies then attack the virus and render it ineffective. Vaccination against a disease stimulates the immune system into producing antibodies against specific viruses, creating protection against the disease and priming the immune system for future infections.

Recombinant technology allows for the production of "tailored" viruses. BHV1 has been studied extensively and an attenuated vaccine against it has been in use for a long time. "By using recombinant techniques the BHV1 strain can be made even safer," said Dr. Lawrence. "We studied the virus, mapped its genes and determined the sites of nonessential genes which could serve as locations for the insertion of genetic material from other pathogens." The pathogen selected was vesicular stomatitis virus which causes a disease prevalent in cattle in Central and South America. The gene for a protein of this virus had been cloned and was available.

To produce the recombinant vaccine, the researchers inserted the cloned vesicular stomatitis gene into a nonessential site in the BHV1 virus. "You don't just put a gene into place," said Dr. Bello. "For it to function within the host virus, a promoter gene has to be attached. We had to identify the promoter and attach it to the gene; this package is called an expression cassette. Once it is inserted into



BHV1 = Bovine herpesvirus 1
VSV = Vesicular stomatitis virus

the virus, we have a recombinant." This is then purified and cloned. The researchers tested the recombinant and found that the inserted gene was being expressed. "Adding new material to a virus is tricky because the addition should not render the virus ineffective, it still must function normally."

"We can add genes from other pathogens," said Dr. Lawrence. "In essence recombinant technology will allow us to create a polyvalent vaccine, one which combats more than one disease. We have applied for a patent." Drs. Bello and Lawrence feel that recombinant vaccines may soon be seen in veterinary clinics. Such preparations are less expensive to produce and will provide an efficient way of delivering vaccinations. They pointed out that other species-specific vector viruses have to be identified to provide safe vaccines for humans and other species.



Bovine herpesvirus 1

Dr. Charles Benson, head of the laboratory of microbiology and immunology, in collaboration with Dr. Robert Eckroade, is studying *Salmonella* strains, in particular, *Salmonella enteritidis*, an organism recently identified in eggs. He hopes that a vaccine can be developed, preventing infection in egg-laying chickens. Dr. Benson is also developing a rapid diagnostic test to facilitate diagnosis of Potomac Horse Fever and a more rapid procedure to determine antibody titers to *Ehrlichia risticii*, the organism causing the disease. Together with Dr. Robert Eckroade, head of the laboratory of avian medicine and pathology, and Dr. Linda Keller, Dr. Benson is developing a procedure which will provide the ability to distinguish vaccine strains from field strains of laryngotracheitis, a viral disease of poultry.

Dr. Roselyn Eisenberg, another researcher in the laboratory, is focusing on herpes simplex virus, also with the goal of developing a vaccine, in addition to studies of gene regulation. Much of this work is basic science, laying the groundwork for future treatment of diseases.

The focus of the laboratory for parasitology is not so much on parasites affecting domestic animals in the United States, but on parasites and their effects in third world countries. The laboratory is the center for parasitologic studies in the University. It has acquired an international reputation from its studies in the field of immunoparasitology, research which focuses on the interactions between host and parasite, and particularly on the antigens parasites produce at various stages of their life cycle. The

mechanism controlling host immunologic responses to parasite infections are also under investigation. Much of the work has important public health implications, for in many instances animals act as reservoirs for human parasite infection.

Among the parasitic diseases studied are leishmaniasis, caused by protozoa, onchocerciasis, Lyme disease, trichinosis, hookworm, and gastrointestinal nematodes in sheep and cattle.

Like the laboratory of microbiology and immunology, the laboratory of pathology has facilities at the Philadelphia campus and at New Bolton Center. Research in this laboratory ranges from studies on the molecular level to classical histopathology. The laboratory now operates the largest biopsy service of any veterinary school in the United States with more than 18,000 animal tissue samples being analyzed annually. Dr. Helen Acland, head of large animal pathology, is working on a variety of projects, including ovine progressive pneumonia.

Dr. Samuel Chacko, professor of pathology, has received worldwide recognition for his studies of the biochemical mechanisms which regulate blood pressure through arterial wall contraction and relaxation in normal and hypertensive animals.

Genetic diseases and their treatment through gene therapy are the focus of Dr. Mark Haskins and Dr. John Wolf. Other research in the pathology laboratory include studies on lymphocyte biology and development of the immune system, investigation of the development of skeletal muscle, the influence of the nervous system on muscle, studies of diseases like tuberculosis, rabies, Potomac Horse Fever, and avian influenza, to name a few.

Aside from research, the responsibilities of the faculty in pathobiology includes teaching and providing diagnostic services to the two hospitals and to practitioners. Faculty teach core courses and offer laboratory experience in pathology, microbiology, immunology, and parasitology to provide the students with the scientific background so necessary in today's veterinary practice.

The research funding in pathobiology comes from many sources, among them the NIH, World Health Organization, National Science Foundation, USDA, Pennsylvania Department of Agriculture, and industry.

Stubbs Laboratory Dedicated

The Stubbs Laboratory was dedicated on September 22, 1988 at the New Bolton Center campus. The building, funded by the Commonwealth of Pennsylvania, is designed as a facility where researchers can safely deal with and manage research with infectious organisms, primarily of poultry. A limited access building, it has an impressive array of safeguards such as air-locks, shower areas, one-way air flow and two air-handling systems equipped with special filters for the complete removal of all microorganisms, including viruses. A special pathological incinerator and a chemical treatment retention tank for effluent waste are also part of the equipment.

The building was named in honor of Evan L. Stubbs V.M.D., Class of 1911, "avian pathologist, gentleman, veterinarian." Dr. Stubbs, the oldest living graduate of the Penn's Veterinary School and Emeritus Professor of Pathology, served on the faculty from 1927 to 1960. During his long career, he made many major contributions to the field of avian medicine, particularly through his studies on avian

influenza and avian tumors.

Infectious diseases of poultry will be studied in this new laboratory, and the School has assembled an avian infectious disease research team. The Stubbs Laboratory is part of the Cooperative Poultry Diagnostic Laboratory at New Bolton Center and it will greatly enhance the School's ability to serve agriculture in the Commonwealth.





Feline Symposium

The Twelfth Annual Feline Symposium will be held on April 15 at the Veterinary Hospital of the University of Pennsylvania. Topics covered in the day-long event will be:

Skin Allergies in Cats, Dr. Kevin Shanley, assistant professor of dermatology;
Taurine and Heart Disease, Dr. Malcolm MacDonald, resident in cardiology;
Feline Infectious Peritonitis, Dr. K. Ann Jeglum, assistant professor of medical oncology;
Feline Nutrition, Dr. Ed Kane, manager, Friskies Feline Center;
Parade of Breeds, Mr. Richard Gebhardt.

The cost for the program is \$35 which includes parking and lunch. Reservations can be made by contacting Dr. M. Josephine Deubler, VHUP, 3850 Spruce Street, Philadelphia, PA 19104-6010.

The Penn Jersey Cat Club Show, a Cat Fanciers Association approved event, will be held April 16 at the Class of 1923 Ice Rink, 3130 Walnut Street, Philadelphia, a few blocks from the Veterinary School. The show will be an all-breed championship show and will feature four household pet rings in addition to the four rings for purebreds.

The show, a benefit event for the School, will be managed by Michael Petersen. Further information about the show can be obtained by calling Mr. Petersen at (609) 466-2607 or the School's Communications Office at (215) 898-1475.

Portrait Day in honor of Donald G. Lee, V.M.D.

Members of the Class of '52 presented a portrait of Dr. Donald G. Lee (V'36) to the School. The painting, created by artist Brian Smith, son of Dr. Maurice S. Smith (V'48), was unveiled during a ceremony on September 13. Members of Dr. Lee's family, representatives of the Class of '52, and faculty attended to reminisce and remember Dr. Lee. Following are the remarks by Dr. Fred Gunther (V'52):

Beginning in September of 1948, fifty-two freshman members of the University of Pennsylvania School of Veterinary Medicine assembled daily for the study of anatomy. During our freshman and sophomore years we labored over the study of the anatomy of the domestic species. Dr. "Don" Lee was the anatomy staff member to whom we turned for counsel and a sympathetic ear when our stresses began to mount. Sympathy and understanding were the hallmarks of the relationship Dr. Lee developed with us.

As our class number shrank slightly with each passing semester, Dr. Lee was available to anyone who had a burden that they wished to share. Because of the length and frequency of anatomy class, there was ample opportunity for Dr. Lee to have dialog with any of our classmates who wished to share their burdens and concerns with him. Classes in histology increased our daily contact with Dr. Lee also. Dr. Lee attained the rank of professor and was appointed head of the department of anatomy the year

New Bolton Center Staffer Uses C.P.R. to Save A Life

Kimberly Buchanan's heroic actions a few weeks ago earned her the eternal gratitude of a colleague and special thanks from University's Vice President for Human Resources Barbara Butterfield. Buchanan's quick thinking and knowledge of cardiovascular-pulmonary resuscitation (C.P.R.) saved the life of Emeritus Professor of Medicine Dr. William Boucher.

Buchanan, a veterinary nurse assistant, and another nurse were grazing their equine patients one morning when she noticed Boucher walking out of the Field Service Building. Boucher, who uses a walker, tripped coming down the steps. Although he caught his balance, his momentum moved him down the steps much faster than he expected. A few moments later, Buchanan saw him "stop and then fall straight over."

"I ran over with my horse and yelled into the building for someone to call an ambulance," Buchanan recalled. "Dr. Boucher had a pretty good gash on his head, and you know how head wounds can bleed, but he looked blueish. I gave my horse to the other nurse and listened for a heartbeat and felt for a pulse. There was nothing."

"All I could think was, 'I can't just let him lay here.' I knew I had to do something."

Buchanan, who had taken a C.P.R. class in high school, says she "went on automatic pilot. I started to resuscitate and in a few minutes he began breathing again."

A few minutes later, the ambulance arrived and took Boucher for an overnight stay at the hospital. He later returned to New Bolton Center and told Buchanan, "I guess I owe you a pretty big thanks."

A special ceremony was held at New Bolton to honor Buchanan for her actions. Barbara Butterfield presented her with a plaque in appreciation and recognition.

Boucher and his wife have had a long history with New Bolton Center. Throughout his career, their home has been open to many a veterinary student for good, hot meals and a warm feeling of family. So distinguished was his service to the Center, that the Field Service Building is named for him. Even after retirement the Bouchers have played an instrumental role in establishing and maintaining emergency funds



Dr. William Boucher

for veterinary students faced with financial crises. Through donations and regular bake sales, for which Mrs. Boucher still bakes cakes and cookies, money is added to the fund.

The Bouchers and Barbara Butterfield aren't the only people who recognize what Kimberly Buchanan did that morning, and how she contributes overall to New Bolton Center. Assistant Dean Bruce Rappaport wrote, "I don't believe there is ever an adequate means of recognizing performance such as yours, but I hope that you'll accept my own thanks and appreciation for your performance...I have to sincerely tell you that this adds to the already established high esteem that I and others have for your abilities and accomplishments at New Bolton Center...You are a perfect example of what makes New Bolton Center above and beyond the rest of the veterinary profession."

Buchanan has worked at New Bolton for a little over a year. With three children, ages six, four and two, she said, "It was the benefits that brought me here. Sure it can get stressful, but still, I like it."

Working at New Bolton Center also fulfills her childhood ambitions. "I have always liked animals. This sounds funny, but really, when I was little I used to think New Bolton would be a really neat place to work, I thought, 'maybe someday.'"

As for her next goal, Kimberly looks forward to attending West Chester State University's nursing program next semester where she will study small- and large animal medicine. "I really am a large animal person," she admits. "I am more afraid of being bitten by a dog than being kicked by a horse." When she earns her diploma it may very well hang on her living room wall next to the plaque just recently presented to her.

Sarah Jarvis

following our completion of these courses. A move we applauded but with regret that it did not occur sooner.

Our class was but one in a long chain of classes to receive the benefit of Dr. Lee's presence. As we came back for alumni functions, the formal Dr. Lee became Don as friendships ripened and deepened.

Don was interested in our career progress as well as the growth of our families. This interest was formally recognized in 1962 when Dr. Lee was appointed associate dean at the Veterinary School with duties pertaining to curriculum and student affairs. It is with affectionate remembrance that we gather today to honor his memory and to emphasize the important part he played in our student lives.



CALENDAR

February 22	Continuing Education Small Animal Spinal Neurosurgery, VHUP
March 8	Continuing Education Small Animal Surgical Emergencies, VHUP
March 15	Continuing Education Thoracic, Urinary and Gastrointestinal Surgery, Meadville, PA
April 2	Veterinary Medical Student Government Teaching Awards Dinner Dance, Hotel DuPont, Wilmington, DE
April 5	Continuing Education Small Animal Anesthesia, VHUP
April 15	12th Annual Feline Symposium, VHUP
April 16	Penn Jersey Car Club Show, Class of 1923 Ice Rink, Philadelphia
May 3	Continuing Education Surgical Approach to the Bones and Joints of Dogs, VHUP
May 4	Continuing Education Surgical Treatment of Otitis Externa and Media, VHUP
May 10	Continuing Education Small Animal Advanced Dentistry, VHUP
May 20	Alumni Day, New Bolton Center
May 22	Commencement, Philadelphia



Dr. Rutman receives a "Penn chair", a retirement present from the members of the department of animal biology.

Retirements

During the last few months a number of faculty members have reached retirement, though a few continue to teach and work here at the School.

Dr. David S. Kronfeld, Elizabeth and William Whitney Clark Professor of Nutrition, retired from Penn. He has been appointed Paul Mellon Distinguished Professor of Agriculture at the College of Agriculture and Life Sciences, Virginia Polytechnic Institute, Blacksburg, VA.

Dr. John T. McGrath, professor of pathology, also retired. The department of pathobiology named the refurbished department conference room in his honor.

Dr. Adelaide M. Delluva, professor of biochemistry, Dr. William Medway, professor of clinical laboratory medicine, and Dr. Robert J. Rutman, professor of biochemistry, also officially retired, but will continue their duties here.



Dr. McGrath cuts the ribbon for the conference room named in his honor.

Scholarships

The Chester Valley Kennel Club and the Penn Treaty Kennel Club each have made a generous contribution to the M. Josephine Deubler, V.M.D. Scholarship Fund.

David T. Zamos is the recipient of a scholarship awarded by The Lloyd's Underwriters, Lloyd's Brokers and Kentucky Agents Joint Equine Research and Education Program Committee. The Mid-Susquehanna Kennel Club scholarship has been awarded to Anne Quakenbush.

A scholarship offered by the Northwestern Connecticut Dog Club has been presented to Amy L. Grice. She also received the Career Advancement Scholarship from the Business and Professional Women's Foundation. Kimberly Ann Werner received a scholarship from the Frank and Amanda Hartman Trust. The Janet F. Cottier Scholarship, presented by SAVE, has been awarded to Lisa Macom.

Frederick Doddy is the recipient of a scholarship offered by the New Jersey Veterinary Education Foundation. Linda K. Mulski received a grant from the Pellegrini Scholarship Fund. Hill's Pet Products has awarded scholarships to one student from each class; the recipients are Melanie Newman, Mary Wilkes, Katrina Jackson, Amanda Johnson-Lengner. A scholarship from the Pocono Mountain Kennel Club has been awarded to Rose A. Crisci. A scholarship from the Union County Kennel Club has been presented to Steven D. Milden.

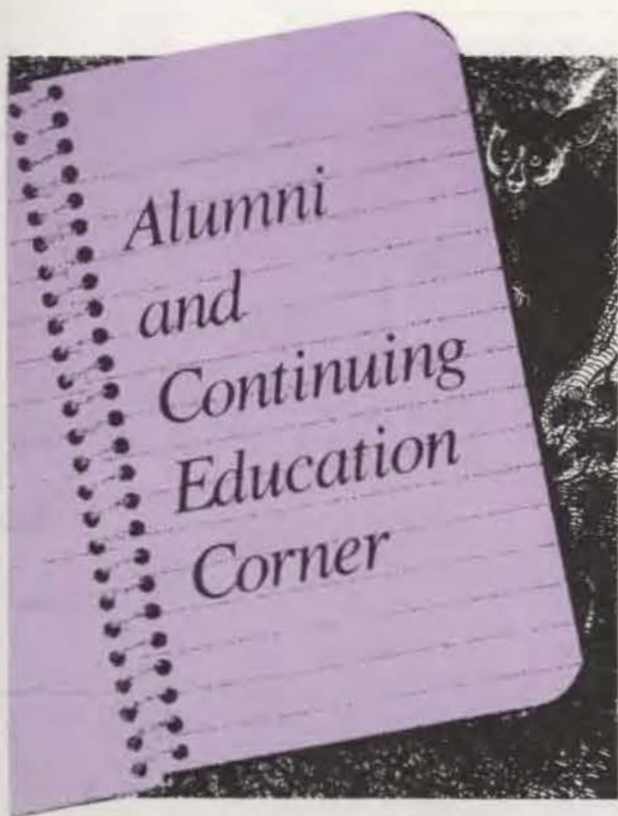
New Admissions Director

Malcolm J. Keiter has joined the School as director of admissions to replace Dr. Joseph F. Skelley, who retired. Mr. Keiter comes to Penn from the University of Medicine and Dentistry of New Jersey where he was director of admission and registrar for the Stratford, NJ campus. Mr. Keiter, born and raised in Chester County, grew up adjacent to New Bolton Center. In his position here, he will work closely with Dr. Charles Newton, associate dean for recruitment.



Sally Star, a TV personality familiar to those growing up when TV was not yet in color, came to VHUP to film a "commercial" that encourages youngsters to find out about veterinary medicine as a profession. Dr. Rebecca

Kirby and a patient provided some insight into a veterinarian's duties. The commercial is being aired during WHY?Y's children's programs.



Alumni Directory

Representatives of Harris Publishing Co., Inc. began telephoning alumni for the verification phase of the University of Pennsylvania School of Veterinary Medicine Alumni Directory project.

Much of the information to be verified on each individual's listing will be going into the Directory. Specifically, current name, academic data, residence address and phone number (if applicable). The scope of this information is an indication of the thorough and complete quality of the entire volume. The Directory will sort these data by name in the alphabetical division, and by class year and geographical location in separate sections of the book. Also included will be a special message from the alumni association as well as photos and information on the School.

Soon locating fellow alumni will be as easy as turning a page with the University of Pennsylvania School of Veterinary Medicine Directory. You may reserve your personal copy when your Harris representative phones, but don't delay. This will be your only opportunity to order this comprehensive new directory.



Phi Zeta News

Last year, in response to notes in this journal, Phi Zeta received many renewed memberships. We were most grateful for the interest, and greatly appreciated the personal notes that accompanied many of the dues. We would like, again, to extend our invitation for any members who would like to revive their contact with this organization (\$5 annual membership or \$10 to renew a lapsed membership.). We would also like to thank you for your interest and invite all members to note on their calendar that this year's Phi Zeta Day, induction ceremony, and dinner will be on March 23, 1989. Further details and the year's calendar will be mailed to all members.

Continuing Education

Our School's continuing education program will swing into full gear in 1989. Seats are still available in the following courses, but they're going fast . . . so return your continuing education registration form or call the Alumni Office at 215-898-4234 if you wish to reserve a space.

Small Animal Surgical Emergencies	3/8/89	\$100.00
Bovine Therapeutics and the Legal Responsibilities of the Practitioner	3/29/89	\$100.00
Small Animal Anesthesia	4/5/89	\$100.00
Surgical Approaches to the Bones and Joints of Dogs	5/3/89	\$275.00
Surgical Treatment of Otitis Externa and Media	5/4/89	\$275.00
Reconstructive Canine Stifle Surgery	5/10/89	\$275.00
Small Animal Advanced Dentistry	5/11/89	\$275.00
Small Animal Radiology: Chest and Abdomen	6/7/89	\$150.00
Small Animal Echocardiography and Abdominal Ultrasound	6/14/89 6/15/89	\$275.00



Alumni Day

Saturday, May 20, 1989
New Bolton Center

A spectacular Alumni Day is planned for Alumni at New Bolton Center. A buffet luncheon, tours of Longwood Gardens, Winterthur, and the Brandywine Museum will keep alumni and guests entertained throughout the day.

The Veterinary Alumni Dinner/Dance will be held on Saturday evening at the historic Hotel DuPont in Wilmington, DE. (Just a short drive from New Bolton Center). Round trip bus transportation will be provided to all tours.

So save the date, especially those classes celebrating reunions in 1989:

Class of 1939	Paul Landis, Class Agent
Class of 1944	Richard Guise, Class Agent
Class of 1949	Sidney Mellman, Class Agent
Class of 1954	Robert Flowers, Class Agent
Class of 1959	Leigh Marsh, Class Agent
Class of 1964	Willi Weichelt, Class Agent
Class of 1969	D. Ray Hostetter, Class Agent
Class of 1974	George Glanzberg, Class Agent
Class of 1979	Joan Regan, Class Agent
Class of 1984	Stephen Peoples, Class Agent

Volunteers

Alumni Volunteers are needed to serve on the following Alumni Committees:

1989-1990 Veterinary Medical Alumni Society Executive Board
1989 Liaison Committee to be held on Wednesday, March 8 and Thursday, March 9, 1989.

Class Agents are needed for the following classes:
1932, 1934, 1950, 1951

If you are interested in serving as an Alumni volunteer, please call the School's Alumni office at 215-898-4234.

Special Continuing Education Seminar for Veterinarians in Western Pennsylvania

Thoracic, Urinary and Gastrointestinal Surgery

Wednesday, March 15, 1989
David Mead Inn
Meadville, PA 16335

SESSION I

2:00 p.m. - 5:00 p.m. Surgery of the Colon, Rectum, Anus and Perineum -
Drs. Niebauer & Orsher
Disease Process
Surgical Technique
Postoperative Care
Postoperative Complications
Anal Sac Fistula
Perineal Hernia

5:00 p.m. - 6:30 p.m. Dinner

SESSION II

6:30 p.m. - 9:00 p.m. Thoracic Surgery -
Dr. Orsher
Lung
Heart
Mediastinum
Pleura
Diaphragm

SESSION III

6:30 p.m. - 9:00 p.m. Urinary System Surgery
Kidney
Ureter
Bladder

This course qualifies for five hours of Continuing Education credit.

Fee:	Members of the Northwestern Pennsylvania Veterinary Medical Association - \$50.00. Nonmembers - \$75.00
Place:	David Meade Inn, 455 Chestnut Street, Meadville, PA
Time:	Registration from 1:00 p.m.- 2:00 p.m. Course begins promptly at 2:00 p.m.
Dinner:	5:00 p.m. - 6:30 p.m. RESERVATIONS MUST BE MADE IN ADVANCE. Cost \$15.00

Please make checks payable to the Trustees of the University of Pennsylvania, and mail with the attached registration form:

University of Pennsylvania
School of Veterinary Medicine
Office of Continuing Education
3800 Spruce Street, Philadelphia, PA. 19104

Name _____	
Address _____	
Telephone _____	Social Security # _____
School _____	Year of Graduation _____
Circle Your Choice;	
Session I	Session II Session III

Bellwether 25

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We'd like to hear your praise, criticisms, or comments. Please address your correspondence to:

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